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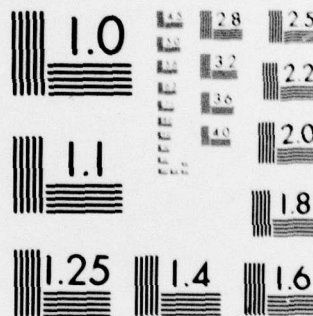UNCLASSIFIED   1B3.00-76-006   NL

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CONSENSUS
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MUTUALITY IN
PEER RATINGS

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JANUARY 1976

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CONSENSUS ON LEADERSHIP VERSUS MUTUALITY IN PEER RATINGS

Report No. 1B3,00-76-006
Project No. 192B
Prepared by: Dr. Robert F. Priest
January 1976

ABSTRACT

This study investigates the effect of mutuality among raters on the inter-rater consistency of LES peer ratings for the Class of 1976. Mutuality is defined as a high degree of similarity in the ratings two raters give to each other. The results indicate that mutuality is not a large component of the LES peer rating system.

There is, however, a large variation among companies in inter-rater consistency of leadership ratings, which requires additional research.

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Trait ratings by peers are frequently used to assess the relative status of the individual being rated on a given trait. The use of peer ratings in practical applications in the military owes much to Jacob L. Moreno, who used the term "sociometric measurement" to apply to such ratings. A sociometric measurement is defined as any attempt to measure a functioning social group or organizational unit.

Scott (1965) distinguished several components which are present, potentially, in the sociometric measurement of any group. He had members of 10 fraternities and sororities of the University of Colorado rate their fellow fraternity (or sorority) members on four traits: Academic orientation (how seriously they take their school work); organization orientation (their contribution to house activities); social orientation (their ability to get along with other kinds of people); and friendship (how much you like them). For each organization and each trait separately, a sociomatrix was constructed, summarizing the rating given by each person in the organization to every other person (pp. 120-121).

Figure 1 illustrates a typical sociomatrix for a small group of individuals. Since the analysis is standard, it does not matter which particular trait was being rated.

	Ratee Number					Sum for Row
	01	02	03	04	05	
01	a	10	8	7	3	28
02	10	a	7	6	4	27
03	6	8	a	5	4	23
04	8	3	6	a	5	22
05	3	4	3	4	a	14
Sum for Column	27	25	24	22	16	

[a] A person does not rate himself.

FIGURE 1. HYPOTHETICAL SOCIOMATRIX

In Scott's analysis, three basic components can be distinguished in any Sociomatrix, which he termed status, bias, and mutuality. Status is the component which reflects individual difference in perceived ability on a trait. In figure 1, individual ratees differ in their relative standing on the trait being rated. (Column sums of 27, 25, etc., reflect status differences on the trait.) Bias is the component which reflects differences between raters in the way they use the rating scale. In Figure 1, rater number 5 tended to rate everyone low, whereas rater number 02 tended to rate his peer high. Individual differences in row sums reflect rater bias. Mutuality is the component which reflects degree of similarity between rater and ratee. For example, in Figure 1 rater 01 gives a rating of 10 to rater 02, who in turn gives a rating of 10 to rater 01. According to Scott, these three components (peer status, rater bias, and mutuality) are potentially present in any sociometric trait rating, and they are not independent.

Scott developed statistical indices of the amount of variance in any sociomatrix which is associated with each of these components.

West Point's leadership evaluation system routinely collects sociometric data. Men rank order the top one-fourth and the bottom one-fourth of the others in their company and class, using USMA Form 2-320. These rank orders can be converted into sociometric ratings of the type studied by Scott. Cadets are required to rate their peers on "ability to command," and supposedly give their own independent, impartial, and objective judgment. It is not known to what extent such judgments are influenced by personal friendship

among cadets. Whether by an unconscious inflating of the estimated abilities of one's friends, or by a direct collusion ("I'll rate you high and you rate me high"), a mutuality bias is always potentially available to cadets in making their ratings. This study was designed to investigate the extent of mutuality bias in LES ratings of the first rating period, AY 74-75, for the Class of 1976 peer ratings.

METHOD

__Data__: Type 2 ratings made by the Class of 1976 on the Class of 1976 were collected in November 1974, on USMA Form 2-320. There were 888 raters and 888 ratees.

__Analysis__: In addition to the usual procedure, cadets were instructed to record their own man number at the bottom of the rating sheet. These numbers were keypunched by AMIC; and after processing the MP311 grades, the punched cards were released to the Director of Institutional Research. A computer program was then written to convert the cards into a sociomatrix. The program assigns the number "1" to the man who is selected as "best" able to command; successive nominations are given higher rank numbers. In a group of N persons, those who are __not__ nominated by a rater are assigned an average rank of $(N+1)/\overline{2}$.

A second program computes measures of peer status, rater bias, and mutuality. (Scott, 1965, pp. 363-376, gives the formulas for these terms). Each of these three measures is an intra-class correlation (eta squared), expressing the proportion of the variance in the sociomatrix which can be attributed to each component. As applied to the USMA data, Scott's "peer status" measure is an index of leadership differentation within the company; for this reason, it is called the leadership index in the remainder of this report. As applied to the USMA data, there is no rater bias, since all rows add to a constant. Thus, the rater bias measure is virtually zero and is not reported. Scott distinguishes among three of mutuality: total mutuality, status-bias concordance, and differential mutuality. Total mutuality reflects the similarity in ratings between all pairs of raters and ratees. Total mutuality is high if the between pairs variance is high relative to the within-pair rating variance. Within-pairs rating variance depends on how similarly the two men in the pair rate each other. Status-bias concordance is the tendency of raters with high status to have high rater bias. In the USMA LES data, status-bias concordance was zero, due to the method of collecting LES ratings, as noted above for rater bias. Differential mutuality, like status-bias concordance, is a subcomponent of total mutuality. It represents the degree to which a person departs from his general bias in rating a colleague in the same manner that that colleague's rating of the person departs from the person's general leadership.

The program was verified on the sample data given by Scott on p. 276, so it is accurate.[2] To aid the interpretation of the results of the analysis, two artificial sociometric matrices were constructed, each composed of the responses of 20 hypothetical cadets. Matrix One (See Appendix A) was constructed with the assumption that all cadets (1) knew who the best leaders were and (2) agreed perfectly. In Matrix One, the leadership index was .98, very high, as expected. The differential mutuality index was .35, and the total mutuality was .05. Note that these indices add to more than 100% of the variance, because they are not mutually orthogonal. Also, it should be noted that some differential mutuality is to be expected, since leaders will rate other leaders high on an objective basis, even if there is no personal friendship. The total mutuality index corrects for mutuality among leaders and is substantially lower than the differential mutuality index. Because the total mutuality index appears to suppress overlapping variance more completely, it is the one mutuality index used in the remainder of this report. Matrix Two was constructed under the assumption that (1) every cadet nominated his best friends as having top leadership (2) cadets pair off in such a way as to virtually eliminate status differences. The pattern of choices in this matrix is known as a circumplex, since man numbers can be arranged in a circle with highest ranking choices being given to the nearest neighbors in the circle (see Appendix B). In Matrix Two, the leadership index was $-.05^1$ and mutuality was .93. Both numbers are in the correct order of magnitude predicted for Matrix Two.

TABLE 1

CONSENSUS ON LEADERSHIP AND MUTUALITY IN PEER RATINGS, CLASS OF 1976, NOV 74 RATINGS

COMPANY	N	PROPORTION OF VARIANCE IN RATINGS, DUE TO[a]	
		LEADERSHIP	MUTUALITY
A2	21	.55	.08
E4	23	.54	.16
D2	26	.52	.12
F3	22	.50	.11
I1	23	.49	.14
C3	31	.46	.14
D1	19	.45	.13
H1	21	.44	.09
B2	19	.42	.17
E2[b]	28	.39	.10
I2	27	.38	.11
E3	30	.38	.19
C1	26	.38	.16
I3	23	.38	.19
G1	22	.36	.07
B4	27	.33	.18
G3	27	.32	.15
E1	29	.32	.23
H4	27	.31	.17
G4	26	.30	.16
F4	23	.30	.19
H3	25	.29	.16
B1	24	.29	.23
B3	21	.27	.11
A3	27	.27	.22
D4	22	.27	.26
C4	29	.27	.14
H2	32	.27	.12
F1	23	.26	.21
G2	24	.25	.29*
C2	22	.25	.11
I4	20	.24	.25*
A4	25	.24	.30*
F2	21	.20	.12
D3	29	.20	.23*
A1	24	.17	.33*
MEDIAN		.315	.160

*Indicates Mutuality is greater than Leadership.

[a] Both Leadership and Mutuality indices are intra-class correlations defined by Scott (1969, p274).

[b] Irregularity in the data: Not all cadets nominated the required number in their company.

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Table 1 shows the leadership and mutuality index for each of the 36 companies in the Class of 1976, first detail. Both indices are to be interpreted as intraclass correlations (eta squared), and hence indicate the proportion of variance in the ratings due to each source of variance. In the case of leadership, the index shows the percentage of variance in sociometric ranks which are associated with individual differences in peer-perceived leadership ability. It represents the degree to which a group of cadets agree among themselves in rank ordering informal leaders. In mutuality, the index represents the degree to which pairs of cadets tend to assign similar leadership ranks to each other.

Table 1 shows that in thirty-one companies the leadership index was higher than the mutuality index. In five companies, the mutuality index was higher. These results suggest that most groups of cadets do not let mutuality influence their ratings to any great extent.

The median proportion of variance due to consensus on leadership is .315. On the average, the concensus is moderate at best, and there is room for a large increase in consensus on leadership with each company.

There appears to be a considerable degree of variation among companies in the leadership index: for Company A2, it is .55, but for Company A1, it is only .17. If we can assume that the sampling distribution of the index is normal, then the difference between Companies A1 and A2 may be tested with the ordinary F ratio. If so, the difference is significant at the .01 level (F=3.23, DF=21/24). Of course, there is no way to establish conclusively that companies differ in leadership consensus without further research. If the leadership index is stable from the first period rating to the second period rating, then we might be in a better position to accept the differences between companies as real. Or, if the leadership index correlates with company morale, with cadet intramural performance, or with other company level indicators, then the differences among companies might be regarded as genuine. Further research would help to verify the results of the present study.

Table 1 shows that mutuality and leadership are inversely related. The correlation is -.49. As one increases, the other tends to decrease. Such results are consistent with theory, since mutuality should interfere with leadership differentiation within the company.

Table 2 shows the magnitude of leadership index for five different traits. The first trait, "ability to command," summarizes the leadership index data for USMA cadets. The other four traits were studies by Scott (1965, p. 124) at Colorado, and were described above. A chi-square test was performed to contrast the five traits and was significant. This indicates that consensus within a group in ranking peer status on different traits depends on the type of trait being rated. For example, the peer status index is lower for "friendship" as a sociometric criterion than for "contribution to house activities." Thus, group members tend to achieve a higher consensus when they rate the latter trait than when they rate friendship. It is worth noting that the USMA criterion, "ability to command a group of men," generally elicits intermediate degrees of consensus on the leadership index. There is significantly more consensus on "ability to command" than on "friendship" (x^2 = 4.2, 1df, p<.05).

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TABLE 2

LEADERSHIP INDEX FOR FIVE TRAITS

Trait	Magnitude of Leadership Index		
	.30 or Below	.31 or Above	Number of Groups
1. Ability to command a group of men[a]	17	19	36
2. How much you like them (Friendship)[b]	9	1	10
3. How seriously they take their schoolwork[b]	3	7	10
4. Their contribution to house activities[b]	2	8	10
5. Their ability to get along with other people[b]	8	2	10

$x^2 = 15.3$, 4df, p<.01.

[a]Source: Table 1, this report.

[b]Source: Scott (1965), p. 124.

The analysis of Table 2 supports the hypothesis that the USMA leadership ratings, which should reflect "ability to command," are not strongly biased by friendship patterns among cadets.

DISCUSSION

The degree of consensus on leadership ranking is usually discussed under the general heading of reliability. The concept of reliability has several different meanings, including consistency over time as well as inter-judge consistency. Inter-judge consistency should be considered as a prerequisite to all other forms of sociometric reliability (Lindzey and Byrne, 1968). Unfortunately, inter-judge consistency has been ignored in prior research at the Military Academy. For example, Tobin and Marcrum (1967) discuss only stability of total ASR scores over time. It has been demonstrated many times over that the LES is highly stable over time. In a recent study of the Class of 1977, the November peer rating component of LES had a correlation of .70 with the March rating (Priest, 1975, p. 6). Thus, the high stability of peer rating has led to the neglect of inter-judge consistency. Outside the Military Academy, correlations between measures of leadership status for random halves of a group are "often in the .80's and .90's" (Lindzey and Byrne, 1968). Considering that the average intra-class correlation in Table 1 was .315 (and the square root of this is .56), it would seem that the inter-rater consistency of cadets within companies is low.

The present study provides additional objective evidence on the relationship between peer leadership ratings and friendships. An earlier reviewer had asserted, on the basis of incomplete evidence, that "peer nominations are not adversely affected by considerations of friendship" (Nadal, 1968, p. 7). It is no longer necessary to extrapolate from research done at other institutions. The evidence in this study is, of course, indirect, in that we did not ask cadets about their friendship choices; nevertheless, if mutual friendship were a strong factor in leadership nominations, it would have interfered more with consensus in leadership. Since the later interference was not observed, we can conclude that friendship is not a strong factor in peer nominations at USMA.

The use of a variety of traits for rating leadership has not been systematically explored at the Military Academy. Lindzey and Byrne (1968) describe several studies in a miscellaneous variety of situations where different sociometric items were "substantially"

correlated, with r's ranging between .50 and .83 (p. 479). This suggests that the specific wording "ability to command a group of men" is not essential for valid rating of leadership. Other wording such as "ability to command," or "contribution to corps-squad activities" might be tried. The full wording of the definition of "leadership" given on USMA Form 2-320 (ability to command a group of men in the accomplishment of an assigned mission which maintaining within the group high standards of discipline, morale, and personal morality) is complex. Perhaps a simpler definition of the criterion for rating would lead to higher consensus on leadership status. That, in turn, would lead to higher reliability of the LES ratings.

Further research is needed to determine precisely the factors which influence peer consensus at the company level. Because the major function of peer ratings is to rank order individuals in leadership ability, the effects of group dynamics on peer rating have been ignored. A better understanding of the group dynamics of peer rating is needed. It is suggested that further research be undertaken to: (1) determine the stability of the leadership consensus index from the first to second rating period; (2) determine the impact of intramural wins and losses on leadership consensus; and (3) determine the relationship between the self-image or morale of the company and its leadership consensus. The present research design could easily be extended to cover the entire Corps of Cadets for the 1976-77 academic year, with virtually no increase in cadet testing time: the present design is unobtrusive. Such research could add to our understanding of the group dynamics of individual companies, and would be particularly valuable for analyzing changes in group dynamics that might be introduced by changes in the Corps of Cadets, such as the admission of women.

REFERENCES

Lindzey, G. and Byrne, D. "Measurement of Social Choice and Interpersonal Attractiveness," in G. Lindzey and E. Aronson (Eds) The Handbook of Social Psychology, Volume Two, Research Methods. Reading, MA: Addison Wesley, 1968.

Nadal, R. "A Review of Peer Ratings Studies," OML Report No. 68-8, October 1968.

Priest, R. F. "Improving Prediction of Fourth Class Leadership by Reweighting Components," Report No. 75-019. West Point, NY: Office of the Director of Institutional Research, June 1975.

Scott, W. A. Values and Organizations. Chicago: Rand-McNally, 1965.

Tobin, D., and Marcrum, R. "Leadership Evaluation Report," Report No. 68-9. West Point, NY: Office of Military Leadership, December 1967.

REFERENCE NOTES

[1] Except for the small negative factor used to correct sample statistics for parameter estimation.

[2] A copy of the program is available at the Office of the Director of Institutional Research.

MATRIX ONE, A HYPOTHETICAL EXAMPLE OF PERFECT PEER CONSENSUS ON LEADERSHIP

Rater Number	Ratee Number																			
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
01	10[a]	1	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20
02	1	10	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20
03	1	2	10	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20
04	1	2	3	10	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20
05	1	2	3	4	10	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20
06	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
07	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
08	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
09	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
10	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
11	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
12	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
13	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
14	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
15	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	16	17	18	19	20
16	1	2	3	4	5	10	10	10	10	10	10	10	10	10	10	10	17	18	19	20
17	1	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	10	18	19	20
18	1	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	10	19	20
19	1	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	10	20
20	1	2	3	4	5	10	10	10	10	10	10	10	10	10	16	17	18	19	20	10

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[a] In the West Point leadership ranking system, which this example simulates, persons do not rate themselves and certain others; such cases are designated by a rating of "10" in this matrix.

APPENDIX B

MATRIX TWO, A HYPOTHETICAL EXAMPLE OF HIGHLY MUTUAL LEADERSHIP RATINGS

Ratee Number

Rater	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
01	10[a]	1	3	5	10	10	10	10	10	16	18	20	19	17	10	10	10	10	4	2
02	1	10	2	4	10	10	10	10	10	17	19	20	18	16	10	10	10	10	5	3
03	4	2	10	1	3	5	10	10	10	10	16	18	20	19	17	10	10	10	10	10
04	5	3	1	10	2	4	10	10	10	10	17	19	20	18	16	10	10	10	10	10
05	10	10	4	2	10	1	3	5	10	10	10	16	18	20	19	17	10	10	10	10
06	10	10	5	3	1	10	2	4	10	10	10	17	19	20	18	16	10	10	10	10
07	10	10	10	10	4	2	10	1	3	5	10	10	16	18	20	19	17	10	10	10
08	10	10	10	10	5	3	1	10	2	4	10	10	17	19	20	18	16	10	10	10
09	10	10	10	10	10	10	4	2	10	1	3	5	10	10	16	18	20	19	17	10
10	16	17	10	10	10	10	5	3	1	10	2	4	10	10	17	19	20	20	18	10
11	18	16	16	17	17	16	10	10	4	2	10	1	3	5	10	10	10	10	10	10
12	20	18	17	19	19	17	10	10	5	3	1	10	2	4	10	10	10	10	10	10
13	20	19	20	20	19	19	16	17	10	10	10	10	10	10	4	2	10	1	3	5
14	17	18	19	18	10	20	18	19	18	16	10	10	10	10	5	3	1	10	2	4
15	16	18	17	16	10	18	19	20	19	20	18	16	10	10	10	10	4	2	10	1
16	10	10	10	10	10	16	10	16	10	16	19	17	17	16	10	10	5	3	1	10
17	10	10	10	17	10	17	10	17	10	20	10	10	20	20	20	20	10	10	10	10
18	10	10	10	10	10	10	10	20	19	20	18	16	10	10	19	19	10	19	17	10
19	3	5	10	10	10	10	10	17	18	16	18	16	10	10	10	10	4	3	2	1
20	2	4	10	10	10	10	10	16	18	20	17	17	10	10	10	10	5	10	10	10

Rater Number

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[a] In the West Point leadership ranking system, which this example simulates, persons do not rate themselves and certain others; such cases are designated by a rating of "10" in this matrix.

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